

THE IMPACT OF THE COVID-19 PANDEMIC ON THE MACROECONOMIC AGGREGATES OF THE EUROPEAN UNION

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ABSTRACT

Economic experts' predictions of a slowdown in the EU's global economy and economic growth in the year 2020 were based on various risks and uncertainties existing on a world scale, ranging from the US-China trade war, traditionally strained relations of the EU and the US on the one hand and the Russian Federation on the other, all the way to BREXIT and economic migration to developed EU countries. However, the COVID-19 pandemic has further aggravated those forecasts, so that the entire EU is recording a historic decline in all macroeconomic aggregates. The beginning of the pandemic in the EU was accompanied by the complete border lockdown of the entire Union, which greatly affected the economies of the member states. The EU is experiencing a decline of both real and nominal GDP, declining incomes, employment decline and unemployment increase. This paper will investigate the impact of COVID-19 onto GDP, unemployment, and EU public debt. Correlation-regression analysis confirms the positive correlation between these variables and the economic crisis caused by the COVID-19 pandemic. In addition to the economic crisis, a crisis of EU health systems, which requires huge economic investments. A more prominent economic recovery is hard to expect until the global pandemic ends. One thing is for certain, this economic crisis will continue in 2021, whereby a more significant recovery is expected only in the year 2022. Certainly, it will take years to make up for the economic losses caused by the pandemic.

Keywords: *COVID-19 pandemic, EU, EU GDP, EU macroeconomic aggregates, economic crisis*

INTRODUCTION

The European Union is a community comprising of 27 countries and is the most powerful economic organization in the world. Member States have ceded a portion of their sovereignty to the EU, thus transferring the responsibility for many economic issues to the Union. Since its inception, one of the EU's goals has been economic prosperity for all its members. The unified, single market has brought many advantages and thanks to it the European Union is now a major world trading power. Although it accounts for only 6.9% of the world's population, EU trade with the rest of the world accounts for approximately 15.6% of world exports and imports. Together with the USA and China, the EU is one of the three largest trade entities in the world. Right after China, it is the world's largest exporter with about 16% share in world exports. In terms of world imports, it is also in second place, just below the US with a share of about 15%. The EU employment rate has been growing steadily since the global trade crisis and lasted until 2020, i.e. until the outbreak of

the COVID-19 pandemic. Simultaneously, the unemployment rate was on a decline, but then rose sharply in 2020. GDP had a growth trend until the pandemic, when it experienced a downturn in nearly all of its member states. Even the most developed member states had a large drop in GDP and entered a recession. GDP in 2020 amounted to about 15 trillion Dollars, which is a sixth of the world's GDP. In 2012, the European Union had by far the largest foreign investment in other countries in the amount of 9.1 trillion dollars and the largest investments of other countries in the EU, amounting to 5.1 trillion dollars. The EU's key trading partners are the United States, China and the United Kingdom. Public debt in 2018 amounted to 80% of GDP, the one in Greece being the highest with 181.1%, whereby the lowest one was registered in Estonia, being 8.4%. The decline in private consumption has particularly affected EU companies, which have been more involved in generating member states' GDP. In some countries, there was an increase in public spending during the pandemic, and we know that since the 1980s, EU governments have set the goal of rationalizing public spending (Alonso, Clifton, Diaz, 2017). According to the forecasts of the World Bank (Global Economic Prospects, 2021), although the global economy will soon emerge from the pandemic, global GDP will remain below its pre-pandemic growth trend for many years. Global cooperation will be key to addressing a plethora of economic challenges laying ahead.

As for the EU, the pandemic began in the first quarter of 2020 with the "lockdown" of Italy, immediately upon which nearly all member states took restrictive measures, with social distancing and border closing being the most crucial ones. To prevent contact and transmission of the virus among humans, many businesses have been temporarily shut down and some permanently closed. The measures taken by the EU and its member states were insufficient to continue the economic growth of previous years, which resulted in a decline of nearly all macroeconomic aggregates. In addition to the economic crisis, the EU was also affected by the health crisis, which strongly affected the labor market and economic life. Enormous funds that were intended for the economy were redirected to the health sector. In 2021, the EU plans to invest vast funds in the vaccination of the population through the common COVAX system, thus ending the pandemic and focusing on economic recovery. However, the sluggishness of the EU administration and the organization of vaccination has been shown in this very example, as some EU candidate countries have proven to be much more successful in this process, e.g. Serbia. The first indicators for January 2021 show a slight recovery of the EU economy, particularly among the most developed members. In the coming period, the EU should show its solidarity in aiding small member states and the ones wishing to become a part of the EU. This is particularly important for the countries of the Western Balkans that are most affected by the pandemic. Small countries are often forced to implement long-term unfavorable development policies and methods (Dirk Krueger, 2009). For countries in transition, the growth trend of public debt is inevitable (Chatterjee, Gibson, Rioja, 2017), which is exactly how the Western Balkan countries behave. In addition, international debt affects small countries with relatively higher incomes in a significantly different way than it affects small countries with low incomes (Kaminarides, Nissan, 1993). Recession recovery strategies show some similarities in economic and employment measures and differences in tax reforms and financial support packages launched by the five most developed countries. There should be a mechanism in which each country shall prepare for an untimely recession (Kolluru, D. M. K. 2021). Based on a review of the literature and a previously defined research problem, in order to direct research towards problem solving, the hypotheses in this paper can be defined as follows: The COVID-19 pandemic will negatively affect GDP, public debt and the EU unemployment rate, whereby the unemployment have a much smaller drop compared to other macroeconomic indicators.

Speaking of the research conducted on the topic of the impact of COVID-19 on the EU economy, the following papers should be mentioned. Maliszewska, Mattoo and Van Der Mensbrugge claim that the corona virus will cause a major economic shock to all countries, particularly to developing countries. The tourism and domestic services sector will be most affected. Likewise, the impact of COVID-19 on GDP and trade was also assessed by utilizing a standard global computal general

equilibrium model (Maliszewska, Maryla; Mattoo, Aaditya; Van Der Mensbrugge, Dominique. 2020). Pagano, Wagner, and Zechner argue that the key question for investors and policy makers is whether COVID-19 will trigger a massive redistribution of capital and labor (Marco Pagano, Christian Wagner, Josef Zechner, 2020). In his paper, Pagano additionally claims that there will be a redistribution of labor during a pandemic between the companies that are highly resistant to the pandemic, i.e., do not require contact and those companies in which close contact is made, e.g., tourism enterprises (Pagano et al. 2020). Many economists have made various assessments of the extent to which companies are compatible with social exclusion, thus directing the countries towards providing support to companies (Dingel and Neiman 2020, Hensvik et al. 2020, Koren and Petó 2020). The decision-making process has changed, preventing financial burdens, growing savings patterns and undesirable unhealthy consumption (Haque, M., Nabila, N., Abdel-Razzaq, A., & Shaznin, K. (2021)). Microsoft founder and one of the richest people in the world, Bill Gates, talked about a possible pandemic back in 2015, so some investors took his words into account and started investing in more resilient companies in the EU and the rest of the world. Baldwin and Weder di Mauro (2020) as well as Bénassy-Quéré and Weder di Mauro (2020) pointed out in their papers that governments should stop pumping money into poorly resilient companies such as airlines, but redirect that money to companies that are more resilient to a pandemic. Otherwise, countries' economies will be at risk and taxpayers' money will be wasted (Baldwin and Weder di Mauro, 2020).

1. RESEARCH METHODOLOGY

In addition to regression and correlation analysis, a comparative and descriptive analysis is used. The linear regression model is represented by the regression equation: $\hat{Y}_i = b_0 + b_1 X_i + \varepsilon_i$, ($i = 1, \dots, n$) whereby the index i refers to the i -th observation, while the variable X is an independent explanatory variable, as it explains variations of the variable Y .

A simple linear regression function is estimated on the basis of the following sample: $\hat{Y}_i = b_0 + b_1 x_i$ whereby \hat{Y}_i is the value of the dependent variable located on the best-fitting regression line, while b_0 and b_1 are estimates of unknown regression parameters of the basic set.

Regression and correlation analysis, along with other analyses of the impact of the pandemic onto EU macroeconomic aggregates, provides an answer to the hypothesis that the pandemic had a negative impact on them. The analysis performed in the SPSS software includes the reading of the following indicators: mean, median, max (maximum), min (minimum), std. dev. (standard deviation), probability (p), std. error (standard estimation error), scatter plot, histogram, coefficient of determination, adjusted coefficient of determination, t -statistics and f -statistics, Pearson's correlation coefficient. Furthermore, Durbin-Watson (d) is a test statistic for autocorrelation in the residuals (prediction errors) from a statistical regression analysis. By using the F test, the hypothesis and statistical significance of the coefficient of determination are tested and upon its application it can be stated whether a model is statistically significant. The subject validity test of the econometric model is used if this value is greater than the value given in the table.

The T test is used to assess whether the variable is statistically significant. Likewise, if the probability of "prob" (f -statistic) is less than 0.05, we assume that the model is appropriate. If none of the variables in the model is statistically significant, the null hypothesis is rejected. For the purpose of relevance of the research and proving the hypothesis, in addition to statistical analyzes, a comparative and descriptive method will be used.

2. ASSESSMENT OF THE IMPACT OF COVID-19 ON GDP, UNEMPLOYMENT, EU PUBLIC DEBT

The research of the impact of COVID-19 on GDP, unemployment, public debt of the EU was done in the statistical program IBM SPSS 26 and presented in the following chapters.

2.1. GDP ANALYSIS

The real GDP per capita growth rates are approximately the same for the period 2013-2019, with the exception of 2012, when the EU emerged from the global economic crisis and 2020 which was marked by the pandemic. In 2020, for the first time in almost a decade, the EU's GDP fell by 7.4%. The largest EU decline in the EU was recorded by Spain, amounting to 12.4%, followed by Italy with 9.9%, Croatia with 9.6% and France with 9.4%. Lithuania and Ireland had the smallest decline in GDP of all the EU countries, amounting to around 2.1%. Additionally, the public debt in nearly all of the countries has increased, predominantly in Greece (over 200%). This is merely a consequence of the governments' attempts to remedy the effects of the pandemic. The following table shows the EU-27 GDP per capita in euros and rates for the period 2012-2020.

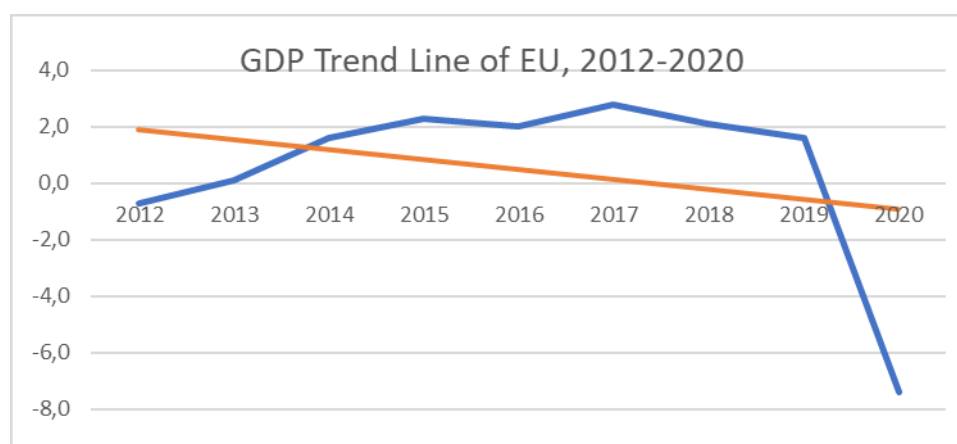
Table 1. GDP EU 27 per capita and rates for the period 2012-2020.

	2012	2013	2014	2015	2016	2017	2018	2019	2020
EU 27 GDP per capita	25900	25730	25750	26150	26670	29280	27110	27770	25715
GDP Growth Rate	-0.7	0.1	1.6	2.3	2.0	2.8	2.1	1.6	-7.4

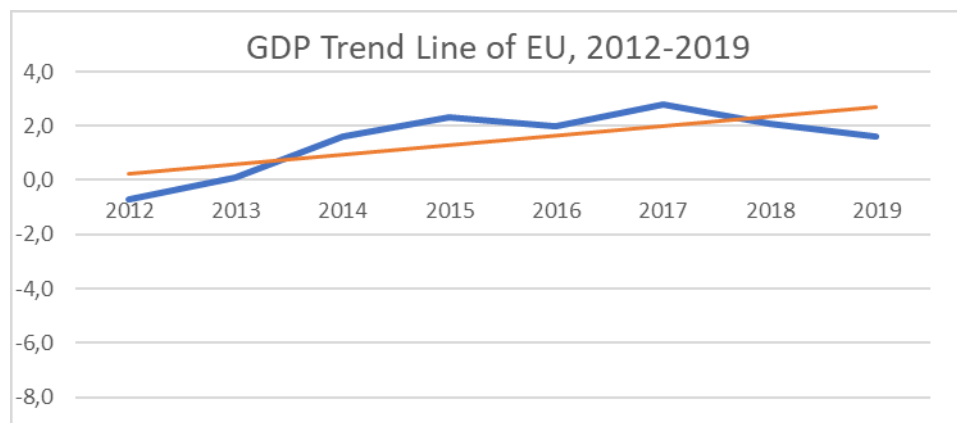
Source: Eurostat.

The table clearly shows that in the observed period 2012-2020, the GDP was the highest in 2017 and amounted to 2.8%, while being the lowest in 2020, amounting to -7.4%. This has been the biggest GDP drop ever since the EU was formed, so the pandemic has had a bigger impact on the EU economy more than any of the world economic crises endured throughout the history of such vast community. Fortunately, the final quarter of 2020 shows a recovery in GDP, which is why a much better situation is expected in 2021, including the recovery of the economy. The following charts demonstrate the EU GDP trend line including and excluding the year 2020.

Figure 1. GDP Trend Line of EU 27 for the period 2012-2020.



Source: Eurostat.

Figure 2. GDP Trend Line of EU 27 for the period 2012-2019.

Source: Eurostat.

From the charts above, a two completely different trend lines of the EU 27 GDP rate can be distinguished. The impact of the pandemic in 2020 has a decisive impact on the historical decline in GDP and the reversal of the trend. The average growth rate before 2020 was 1.5%, but it drops down to 0.5% once the year 2020 is included. A single year, as opposed to a 9-year period, was sufficient to slash the average growth rate by 1% which is an incredible indicator of a decline in the EU in the pandemic year.

2.2. UNEMPLOYMENT ANALYSIS

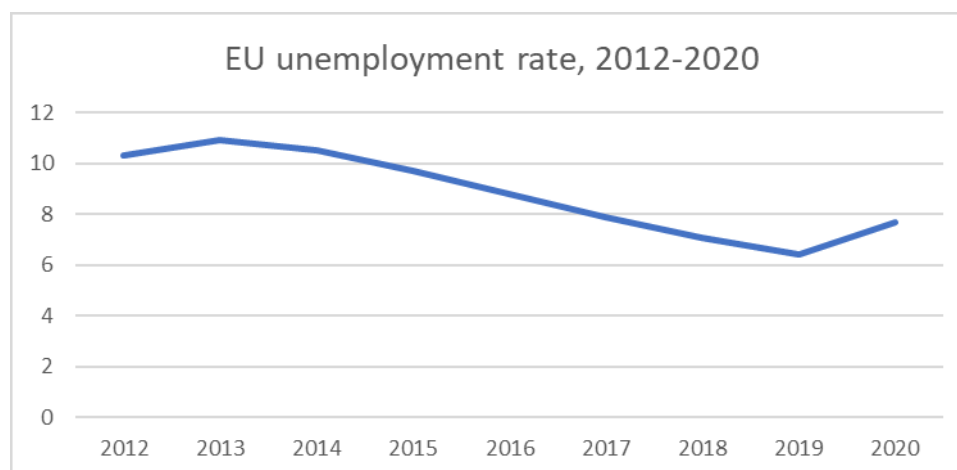
The unemployment rate of the EU in the last waves of accession of Bulgaria, Romania and Croatia has increased. There is a vast difference in the development of countries and markets among EU members. At the time of the pandemic, the biggest drop in unemployment was in two developed countries, France and Italy, amounting to over 10%. Were it not for government measures among member states, the labor market would have experienced much more intense collapse. The following table demonstrates the EU27 unemployment rate for the period 2012-2020.

Table 2. EU27 unemployment rate for the period 2012 - 2020.

	2012	2013	2014	2015	2016	2017	2018	2019	2020
EU27 unemployment rate	10.3	10.9	10.5	9.7	8.8	7.9	7.1	6.4	7.7

Source: Eurostat.

From the table above it is evident that in 2013 the unemployment rate in the EU was increased by 0.6%, which can be attributed to the consequences of the global economic crisis. Another thing that is also evident is that during the COVID-19 pandemic, the unemployment rate rose to 7.7%. A positive, multi-year downward trend has been stopped and equaled with the year 2017. As for the EU forecast for 2021, it is estimated that unemployment will rise to 8.6%, while its decline is expected only in 2022 and is to reach about 8%. The following chart shows the trend of the unemployment rate in the EU 27 for the period 2012-2020.

Figure 3. EU27 unemployment rate for the period 2012 - 2020.

Source: Eurostat.

From the chart above, it is evident see that the unemployment rate in the period following the global economic crisis maintained its decline 2019, when it reached 6.4%. The average rate was 8.8%, so the drop in unemployment in 2020 to 7.8% is not so big from a statistic point of view. However, it is a hint of a poorer economic situation and a big decline in economic activity due to the consequences of the pandemic, and it would certainly have been greater if the member states had not specifically intervened in this field. Moreover, the countries that have been most affected will be able to use funds from the EU Recovery Fund, which could play a significant role. With timely action, this crisis could last shorter than other world crises.

2.3. PUBLIC DEBT ANALYSIS

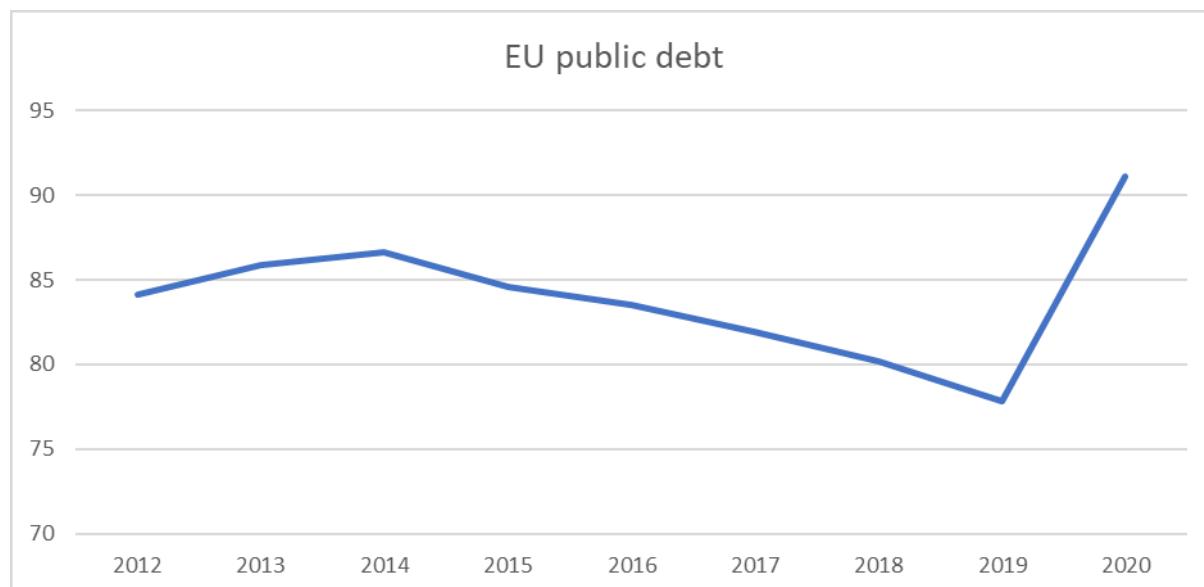
Public debt in the EU has been declining over the past years, with the exception of a few member states. The EU stabilized its finances after the global economic crisis and lowered its public debt in 2018 below 80%. The following table shows the share of public debt in % of EU-27 GDP for the period 2012-2020.

Table 3. Share of public debt (%) in GDP of EU 27 in the period 2012-2020.

	2012	2013	2014	2015	2016	2017	2018	2019	2020
EU Public Debt	84.1	85.9	86.6	84.6	83.5	81.9	79.6	77.8	91.1

Source: Eurostat.

The table above shows that the public debt has been decreasing since 2014, and that in 2020 it rose sharply to the highest level in recent decades. This is a consequence of the intervention of countries in mitigating with the consequences of the pandemic. Likewise, many countries borrowed funds to invest in the health sector, which required high level of funding at the time of the pandemic. The following chart shows the public debt trend in the EU 27 for the period 2012-2020.

Figure 4. EU27 public debt for the period 2012 - 2020.

Source: Eurostat.

The chart shows that the public debt in the EU has risen sharply in 2020. The public debt has risen in nearly all of the EU countries, most notably in Greece - by over 200%, Italy by 159% and Portugal by 134%. Estonia has the lowest public debt of 19%, followed by Bulgaria and Luxembourg, amounting to 26% each. It is especially worrying that the pandemic did not end in 2021 and that a new growth of public debt is expected, which is why a troubled period in the EU is to be expected in that respect.

3. MODEL, RESULTS AND DISCUSSION

We will thus perform a regression and correlation analysis for the two time periods and discuss and analyze the respective results. The first period covers the span from the year 2012 to 2019, whereas the second period is from 2012 to 2020. By comparing the results, we will obtain the information to what extent has the year 2020 affected the GDP of the EU 27.

Table 4. GDP, EU27 unemployment rate and public debt for the period 2012 - 2020.

	2012	2013	2014	2015	2016	2017	2018	2019	2020
GDP EU 27 per capita	25900	25730	25750	26150	26670	29280	27110	27770	25715
GDP Growth Rate	-0.7	0.1	1.6	2.3	2	2.8	2.1	1.6	-7.4
EU27 unemployment rate	10.3	10.9	10.5	9.7	8.8	7.9	7.1	6.4	7.7
EU Public Debt	84.1	85.9	86.6	84.6	83.5	81.9	80.2	77.8	91.1

Source: Eurostat.

3.1. ANALYSIS FOR THE 2012 – 2019.

Regression Analysis Results

Table 5. Descriptive Statistics.

	Mean	Std. Deviation	N
GDP	1.4750	1.18050	8
Unemployment	8.9500	1.67503	8
Public Debt	83.0750	2.96250	8

Source: author's analysis using the spss program.

Table 6. Correlations.

		GDP	Unemployment	Public Debt
Pearson Correlation	GDP	1.000	-.560	-.335
	Unemployment	-.560	1.000	.963
	Public Debt	-.335	.963	1.000
Sig. (1-tailed)	GDP	.	.074	.209
	Unemployment	.074	.	.000
	Public Debt	.209	.000	.
N	GDP	8	8	8
	Unemployment	8	8	8
	Public Debt	8	8	8

Source: author's analysis using the spss program.

Table 7. Model Summary^b.

Model:	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.939a	.881	.833	.48175	.881	18.516	2	5	.005	3.055

a. Predictors (Constant), Public Debt, Unemployment

b. Dependent Variable: GDP

Source: author's analysis using the spss program.

Table 8. ANOVA^a.

Model:		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	8.595	2	4.297	18.516	.005 ^b
	Residual	1.160	5	.232		
	Total	9.755	7			

a. Dependent Variable: GDP

b. Predictors (Constant), Public Debt, Unemployment

Source: author's analysis using the spss program.

Table 9. Coefficients^a.

Model:		Unstandardized Coefficients		Standardized Coefficients		Correlations			Collinearity Statistics		
		B	Std. Error	Beta	ton	Sig.	Zero-order	Partial	Part:	Tolerance	VIF
1	(Constant)	-70.250	15.440		-4.550	.006					
	Unemployment	-2.283	.402	-3.240	-5.684	.002	-.560	-.931	-.877	.073	13.657
	Public Debt	1.109	.227	2.784	4.884	.005	-.335	.909	.753	.073	13.657

a. Dependent Variable: GDP

Source: author's analysis using the spss program.

Table 10. Collinearity Diagnostics^a.

Model:	Dimension	Eigenvalue	Condition Index	Variance Proportions		
				(Constant)	Unemployment	Public Debt
1	1	2.983	1.000	.00	.00	.00
	2	.017	13.262	.00	.08	.00
	3	4.784E-5	249.715	1.00	.92	1.00

a. Dependent Variable: GDP

Source: author's analysis using the spss program.

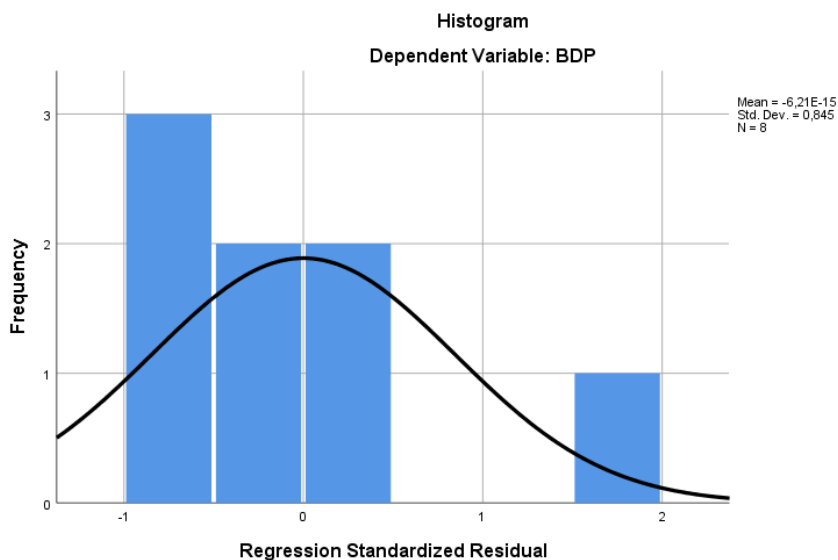
Table 11. Residuals Statistics^a.

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	-.4706	2.5691	1.4750	1.10806	8
Residual	-.40998	.84581	.00000	.40716	8
Std. Predicted Value	-1.756	.987	.000	1.000	8
Std. Residual	-.851	1.756	.000	.845	8

a. Dependent Variable: GDP

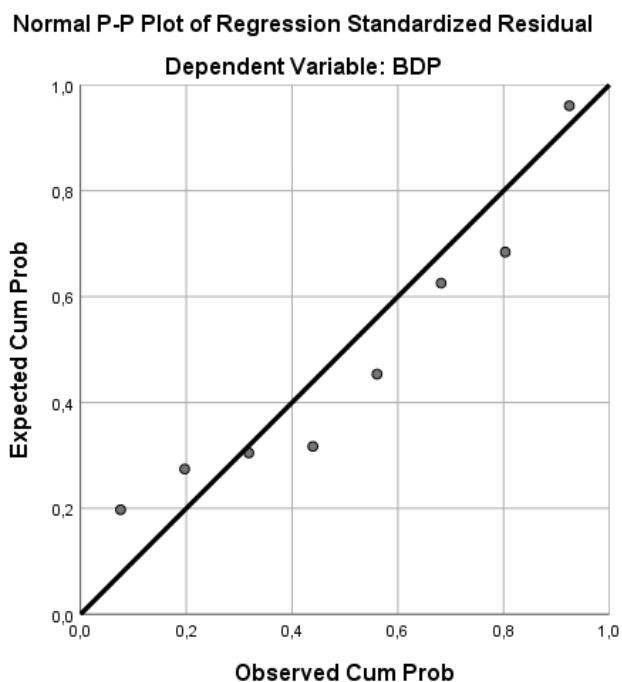
Source: author's analysis using the spss program.

Figure 5. Histogram.



Source: author's analysis using the spss program.

Figure 6. Plot of regression.



Source: author's analysis using the spss program.

Linear dependence can be estimated based on the following model:
 $\hat{Y}_i = b_0 + b_1 X_{1i} + b_2 X_{2i}$, $i=1, \dots, 13$

The analysis from a statistical software provided us with the following: $b_0 = -70.250$; $b_1 = -2.283$; $b_2 = 1.109$, so the regression equation is as follows:
 $Y = -70.250 - 2.283 X_1 + 1.109 X_2$

F statistics is 18.516, with the theoretical value of t-statistics being lower. Therefore, it can be said

that the evaluated model is quite good according to the criteria of t and F statistics. The Durbin-Watson value is greater than 2 and amounts to 3.055, indicating a negative serial autocorrelation between the residuals. The coefficient of determination is 88.6%, which shows that the variations of the GDP are determined by the variations of these aggregates with 88.6%. Pearson's correlation coefficient for unemployment according to its strength is -56%, which can be characterized as a significant correlation. As for the public debt, the Pearson coefficient is -33.5, i.e. there is a weak correlation. The correlation sign points us in the right direction, that is, in both our cases the correlation is negative. It also shows the existence of linear connectivity and continuous normal distribution. From the histogram it can be seen that the standard deviation is 0.845 and that the chart contains normal distribution, i.e. the curve is a "bell shaped" one. The scatter plot shows a direct linear relationship between GDP and the variables.

3.2. ANALYSIS FOR THE PERIOD 2012 – 2020.

Regression Analysis Results

Table 12. Descriptive Statistics.

	Mean	Std. Deviation	N
GDP	.4889	3.15771	9
Unemployment	8.8111	1.62130	9
Public Debt	83.9667	3.85162	9

Source: author's analysis using the spss program.

Table 13. Correlations.

		GDP	unemployment	public debt
Pearson Correlation	GDP	1.000	.052	-.735
	Unemployment	.052	1.000	.491
	Public Debt	-.735	.491	1.000
Sig. (1-tailed)	GDP	.	.448	.012
	Unemployment	.448	.	.090
	Public Debt	.012	.090	.
N	GDP	9	9	9
	Unemployment	9	9	9
	Public Debt	9	9	9

Source: author's analysis using the spss program.

Table 14. Model Summary^b.

Model:	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				Sig. F Change	Durbin-Watson
					R Square Change	F Change	df1	df2		
1	.874 ^a	.764	.686	1.77051	.764	9.724	2	6	.013	.748

a. Predictors (Constant), Public Debt, Unemployment

b. Dependent Variable: GDP

Source: author's analysis using the spss program.

Table 15. ANOVA^a.

Model:		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	60.961	2	30.480	9.724	.013 ^b
	Residual	18.808	6	3.135		
	Total	79.769	8			

a. Dependent Variable: GDP

b. Predictors (Constant), Public Debt, Unemployment

Source: author's analysis using the spss program.

Table 16. Coefficients^a.

Model:		Unstandardized Coefficients		Standardized Coefficients	ton	Sig.	Correlations			Collinearity Statistics		
		B	Std. Error	Beta			Zero-order	Partial	Part:	Tolerance	VIF	
1	(Constant)	60.120	14.174		4.242	.005						
	Unemployment	1.058	.443	.543	2.388	.054	.052	.698	.473	.759	1.317	
	Public Debt	-.821	.187	-1.002	-4.402	.005	-.735	-.874	-.873	.759	1.317	

a. Dependent Variable: gdp

Source: author's analysis using the spss program.

Table 17. Collinearity Diagnostics^a.

Model:	Dimension	Eigenvalue	Condition Index	Variance Proportions		
				(Constant)	Unemployment	Public Debt
1	1	2.982	1.000	.00	.00	.00
	2	.018	13.000	.02	.83	.01
	3	.001	61.549	.98	.16	.99

a. Dependent Variable: gdp

Source: author's analysis using the spss program.

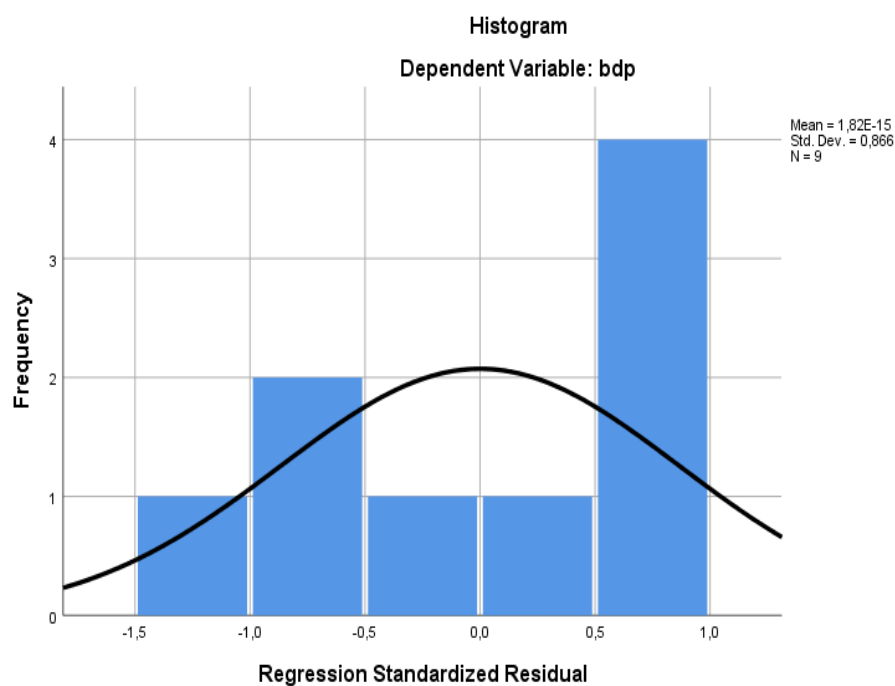
Table 18. Residuals Statistics^a.

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	-6.5446	3.0019	.4889	2.76045	9
Residual	-2.65472	1.57796	.00000	1.53331	9
Std. Predicted Value	-2.548	.910	.000	1.000	9
Std. Residual	-1.499	.891	.000	.866	9

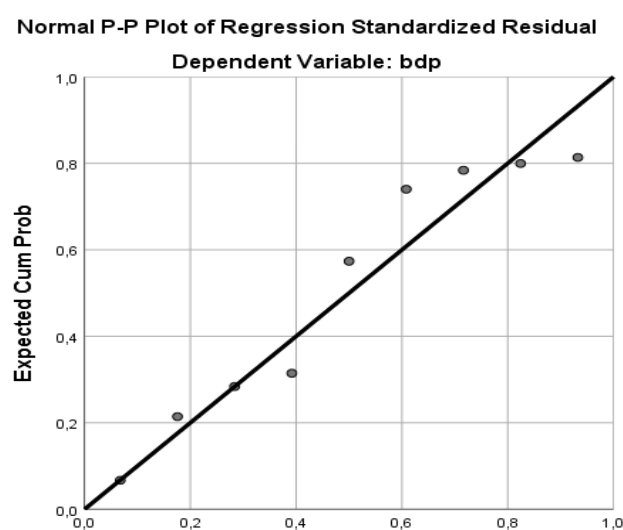
a. Dependent Variable: GDP

Source: author's analysis using the spss program.

Figure 7. Histogram.



Source: author's analysis using the spss program.

Figure 8. Plot of regression.

Source: author's analysis using the spss program.

Linear dependence can be estimated based on the following model:

$$\hat{Y}_i = b_0 + b_1 X_{1i} + b_2 X_{2i}, \quad i=1, \dots, 13$$

The analysis from a statistical software provided us with the following: $b_0 = 60.120$; $b_1 = 1.058$ $b_2 = -0.821$ so the regression equation is as follows:

$$Y = 60.120 + 1.058 X_1 - 0.821 X_2$$

F statistics is 9.724, with the theoretical value of t-statistics being lower. Therefore, it can be said that the evaluated model is quite good according to the criteria of t and F statistics. This also means that we accept the hypothesis from the paper on the statistically significant impact of the observed aggregates on GDP. Public debt growth of 1% leads to a decline in GDP by 0.82%. The model shows that public debt has a greater impact on GDP, i.e. the statistical significance of its regression coefficient is 0.005, while it is higher for unemployment. However, that does not mean that this variable should be ignored. The Durbin-Watson value is less than 2 and amounts to 0.748, indicating a positive serial autocorrelation between the residuals. The coefficient of determination is 76.4%, showing that the variations of the GDP are determined by the variations of these aggregates with 76.4%. Pearson's correlation coefficient for unemployment according to the degree of strength is 5%, which can be characterized as a weak correlation. For public debt, the Pearson coefficient is -73.5, i.e. there is a strong correlation. The sign of the correlation points us in the right direction, that is, in our second case it is negative. It also shows the existence of linear connectivity and continuous normal distribution. The histogram shows that the standard deviation is 0.866 and that the chart of the normal distribution, i.e. the curve is "bell shaped". The scatter plot shows a direct linear relationship between GDP and the variables.

CONCLUSION

The COVID 2019 pandemic, which struck the EU in early 2020, demonstrated how non-financial and non-economic factors can affect economic trends and the economy on a global scale and cause a recession at that. In addition to standard economic analyzes that include factors of political instability, wars, etc. the current events will certainly cause that a future economic researches divert more attention to this issue. The economic policies of certain countries are to divert particular attention to the health sector, whereby some of them will review the current policy of securing and providing health care to the population. The growth of the already large public debt in the coming years is inevitable, precisely because of the stabilization of the market caused by the pandemic.

From the analysis of the two time periods, one excluding and the other including the year of the pandemic, we see that in 2020 there was a sharp increase of the public debt, which in recent years had a declining trend, which confirmed one of the hypotheses in the paper. The second analysis shows a strong correlation between public debt and EU27 GDP, while the first one demonstrates a weaker correlation. This can be explained by the sharp increase in public debt in the year of the pandemic, with the given increase amounting to 13.3% in the EU. For the period 2012-2019, the average share of public debt in the EU was 83%, with such percentage increasing to 84% once the year 2020 is included. This implies that the year 2020 had by far the highest impact on the GDP rate compared to all the other years. The multi-year trend of GDP decline was interrupted in the year of the pandemic, which also confirms the hypotheses set in this paper. The analysis also showed that a 1% increase in public debt leads to a 0.82% decline in GDP. The regression model of our analysis is as follows: $Y = 60.120 + 1.058X_1 - 0.821X_2$. A Durbin-Watson stats test is less than 2 and amounts to 0.748, indicating a positive serial autocorrelation between the residuals. The coefficient of determination is 76.4%, which shows that the variations of the GDP are determined by the variations of these aggregates with 76.4%. The reason for the growth of the public debt should also be sought in the health crisis that struck the EU, i.e. in the investment of member states in that sector. Likewise, the growth of public debt was also based by the investment of countries in preserving numerous companies and jobs, which caused a smaller drop in the unemployment rate than expected, which confirms the hypothesis that this pandemic had a smaller impact on employment. For this reason, the analysis showed a weak correlation between GDP and the unemployment rate, i.e., the Pearson correlation coefficient amounted to merely 5%. The unemployment rate in 2020 increased from 6.4% to 7.7%, i.e. to the level from the mid-2017. Unemployment rates are forecasted to rise in 2021, and its stabilization is expected in 2022. The real GDP growth rates of the EU per capita are approximately the same for the period 2013-2019, with the exception of the year 2012 when the EU emerged from the global economic crisis and the year 2020 - the year of the pandemic. In 2020, for the first time in almost a decade, GDP fell by 7.4%. The last quarter of 2020 shows a recovery in GDP, so that in 2020 the economy is expected to stabilize, but not to achieve a full recovery.

The following economic policy measures should be such as to reduce health and economic uncertainty and to provide preconditions for the economy to adapt to the pandemic, which will obviously continue in 2021. Vaccination of the population should relieve the stringent measures that stifle the economy, thus enabling the growth of economic activity, as this pandemic will also have long-term economic consequences. The economic losses in the EU are enormous, in spite of the state aid to affected sectors. In mid-2020, the European Commission adopted a "Recovery Program" based on solidarity, in which two thirds of the money would be non-refundable, and the rest would be distributed as loans at favorable interest rates. The following period and the reaction of the EU will be crucial for the further direction of overcoming the economic crisis caused by the pandemic.

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